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The *new*

GROWING the **MESEMBS**

by **ed storms**

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by **ed storms**

To my dear wife,

RUTH

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Cover photo: *Fenestraria aurantiaca*



from L. fransisci site, Halenburgs, S.W. Africa



Knersvlakte, near Vanrhynsdorp, Cape Province

PREFACE

Any attempt at giving instructions on how to grow the Mesembryanthemums, popularly known as "Mesembs", is faced with the problem of the countless variables encountered in the different growing situations. One set of rules cannot apply to all. This problem is treated only too frequently with vague generalities which leave us with the same questions we had in the beginning, or by very pedantic instructions given with such authority that we are tempted to accept them as universal truths, disregarding our own unique growing environments. Obviously, we can only describe the methods we have found to be successful in growing the Mesembs under our own conditions. You must take into consideration the environmental differences between a greenhouse in Texas and your own growing situation.

In this revised edition of *GROWING THE MESEMBS*, habitat information is again included because we must first become acquainted with the conditions under which these plants grow in nature before we can intelligently begin to create a sensi-

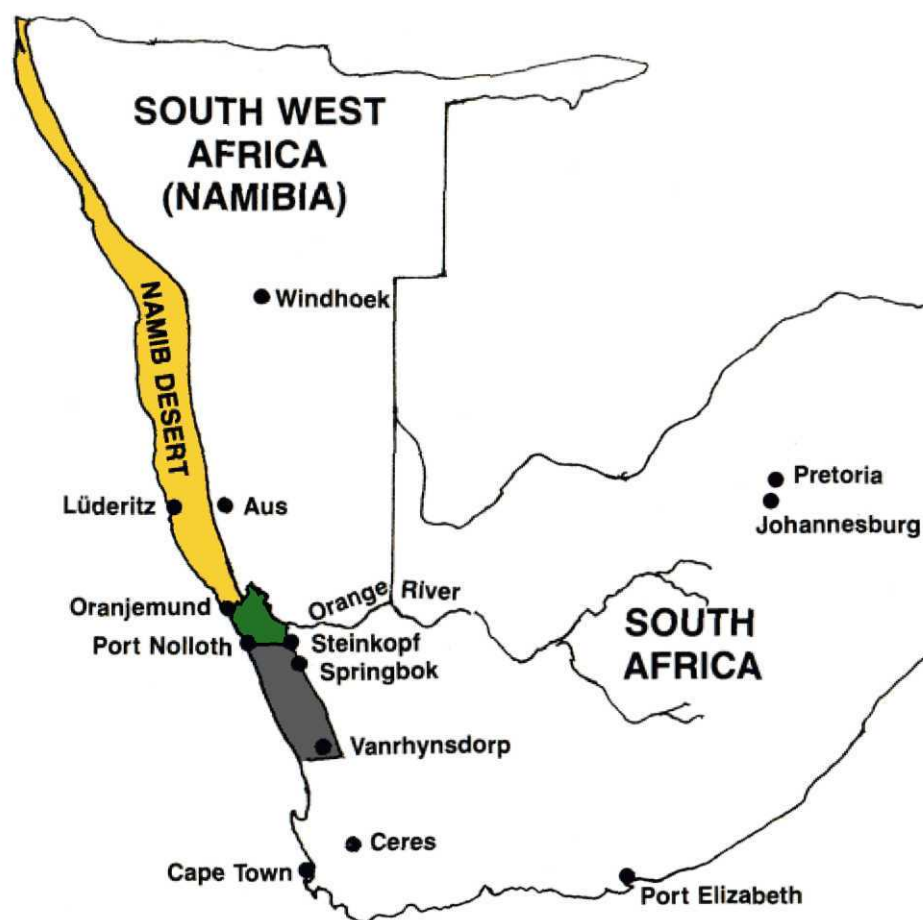
ble environment for their cultivation. Not that it is necessary, or possible, to duplicate their habitat environment, but we must provide them with conditions within their range of tolerance.

For the first time in any publication, *GROWING THE MESEMBS*, revised, illustrates 144 varieties (including regional and color forms) of *LITHOPS* with multiple specimens so that the variations within a variety may be shown. The plants selected for the photographs were carefully chosen to be representative of that particular taxon and even though extreme variations may be seen in some cases, these variations are commonly found in the variety and are not aberrants seldom encountered.

No attempt has been made to cover all the genera of the Mesembryanthemaceae, a task far beyond the scope of this small work. We have dealt only with those plants most often encountered in collections and those whose growing habits are familiar to us.

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-  **NAMIB DESERT**
-  **RICHTERSVELD**
-  **NAMAQUALAND**



Cheiridopsis candidissima near Springbok

HABITAT

The greatest concentration of the Mesembis is found in the southern part of South Africa, up the west coast through Namaqualand, the Richtersveld, Bushmanland, into the Namib, Namaland, and the central part of South West Africa/Namibia. Many species are quite restricted in their dispersal while others are widespread, growing under varying conditions. For example, *Cheiridopsis peculiaris*, is found only in a small area on the slopes of a low, sandstone hill within sight of Steinkopf, while *Cheiridopsis candidissima* grows like a weed by the roadside in

large colonies all through Namaqualand, up the Orange River into the Richtersveld.

Namaqualand is the area along the coast between Vanrhynsdorp and Steinkopf. Here, the rain falls in winter, at which time it is quite cool though seldom reaching freezing temperatures except in the higher mountainous locations. In summer the area is hot and arid. The Knersvlakte, a special section of Namaqualand just north of Vanrhynsdorp, is a gold mine of succulents. Legend has it that it received its name from the repeated sound of 'kniers', 'kniers',

'kniers' made by the men and wagons as they trekked through the quartz gravel. Almost as far as the eye can see are low hills covered with white quartz and succulents growing so thickly that it is almost impossible to walk without stepping on *Argyroderma*, *Conophytum*, *Monilaria*, *Oophytum*, and *Dactyloopsis* growing along with *Cotyledon reticulata*, *C. luteosquamata*, *Crassula* and various shrubby Mesembs. In some areas the soil contains a large percentage of clay, and is somewhat saline, being quite salty to the taste. However, there are always sufficient quantities of sand and quartz gravel to give it porosity. *Lithops divergens* is found in this area as is the rare *Maughaniellaluckhoffii*.

Farther north toward Springbok and Steinkopf we find many species of *Conophytum* on low hills of shale and granite, growing in crevices with lichen in a trace of soil on large sloping boulders. *Conophytum*, with the exception of those species found in the Kniersvlakte, and the bi-lobed species, usually grow just under the rim of a mountain. Here the plants sometimes experience freezing temperatures in winter but bake during the hot dry summer.

The area north of Steinkopf to the Orange River is known as the Richtersveld where rain, if any, comes in winter. Near Port Nolloth the coastal plains of grey sand present a dismal picture in winter with the cold biting wind blowing constantly.



Fog bank near Springbok, Cape Province

North and east of Port Nolloth we find ranges covered with white quartz and Mesembs such as *Conophytum*, *Odontophorus*, *Cheiridopsis*, and *Mitrophyllum*. *Lithops marmorata*, *L. meyeri*, and *Ophthalmophyllum littlewoodii* are also found in this area. Going east from Alexander Bay along the Orange River we find *Fenestraria* buried to the tips of its leaves in sand, depending on coastal fogs and drizzles for its moisture.

Farther inland along the Orange River on the way to the "Hells kloof," we encounter *Dracophilus*, *Juttadinteria*, *Cheiridopsis*, and *Psammophora*. The keynote of the Richtersveld is drought, with many of the plants along the coast depending on heavy fogs for their existence. These fogs form along the river and feed out into small valleys far inland to provide life-giving moisture for the plants. During one mid-winter visit, we noticed the plants were in excellent condition due to recent rains in the area. We were told by a farmer that the rains they had received about six weeks prior to our visit were the heaviest they had seen in 16 years. The amount? Almost two inches!

On another occasion during an extremely dry period, the Richtersveld was absolutely parched with the plants shriveled and dried to the point of being almost impossible to find. However, early one morning before the fog burned off it was interesting to find that the soil on one side of a small outcropping was moist to a depth of about an inch from the foggy precipitation that slowly collected as dew on the rocks and eventually dribbled down to the soil. Here there were a few *Conophytum* surviving, but a few feet around

the point in the lee of the outcropping the soil was dry and devoid of plants. From this you can readily see how little moisture these plants need to survive, and how precariously localized are some of their minute habitats.

To the east of Namaqualand and the Richtersveld lies the Bushmanland with ranges of hills in its western and northern areas where we find various species of *Lithops*, *Titanopsis*, *Aloinopsis*, and *Dinteranthus* along with the ever-present *Cheiridopsis*. The Bushmanland is a transitional rainfall area with the western portion getting rain in all seasons, while summer rains become more prevalent toward the east.

Crossing the Orange River into South West Africa/Namibia we find the Namib Desert running for over a thousand miles along the coast. Here, as in Namaqualand, the succulents depend mostly on winter fogs produced by the cold Benguela current for their moisture. Around Luderitz are found colonies of *L. optica* and on up the coast there is *Jensenobotrya* at Spencers Bay. From Oranjemund to Luderitz lies the 'Sperrgebiet' (the Forbidden Area or Diamond Area #1) where we find more colonies of *L. optica* as well as species of *Juttadinteria* and the rare *Namibia*. To the east of the Namib and just north of the Bushmanland, is Namaland where numerous varieties of *Lithops* are found along with *Dinteranthus*, *Ophthalmophyllum*, *Lapidaria*, and *Conophytum*. This is one of the most arid regions in South West Africa, and the rains, when and if, come in the winter.

North of Namaland and to the east of the Namib lies the central region of South West Africa/Namibia with

the Khomas Hochland and the Auas Mountains near Windhoek where we find *Lithops pseudotruncatella* flourishing with quite adequate rains in the form of summer thundershowers. To the south, and closer to the Namib, is the type locality of *L. gesinae* v. *annae* near Helmeringhausen as well as various varieties of *L. schwantesii*. The beautiful *Lithops bella* can be found (of all places) just down the dry river bed from the city garbage dump at Aus!

In the southern Cape region there is a rather isolated area east of Cape Town known as the Little Karoo with an extremely arid climate. Here, the plants survive on infrequent winter rains. The entire genus of *Gibbaeum* is found here along with the closely

related *Imitaria* and *Antegibbaeum*. To the northwest of the Little Karoo lies the Ceres Karoo with a similar scarcity of rain. The Ceres is the home of *Didymaotis* and *Lithops comptonii* and its variety. Here, the winter can be quite cold with temperatures often falling below freezing.

From these brief descriptions of the various areas where the Mesembys are found, we may draw a fairly accurate picture of their drought-stricken existence. The sun is brilliant, even in winter, and becomes a scorching furnace in summer. In many areas a prolonged drought may last for well over a year, so we should not be too reluctant to let our plants in cultivation go for a few weeks or months without heavy watering.



Lithops optica site, Mile 70 from Oranjemund, S.W.A.

SOIL

The immediate concern of a beginning collector is usually the soil mix. For the Mesembs this problem is easily solved with a sandy, porous mix that drains well. They may be grown successfully in one of the commercial potting mixes for house plants by adding coarse sand.

Having experimented with various soil mixes over a period of years, we finally settled on an organic mix made especially for the nursery trade plus additional sand. One to two parts of builders sand is added to three parts of the commercial mix plus a little Dolomite to keep the pH closer to neutral since our water supply is on the acid side. Nearly any of the packaged houseplant mixes readily available in garden shops is suitable with the addition of sharp sand. If available, a reddish, sandy ferruginous soil may be substituted for a portion of the commercial mix to provide trace elements.

Although the soils in habitat are usually very high in mineral concentrations, we must remember that the plants avail themselves of this rich feast only when there is sufficient moisture present to permit assimilation by the root systems. When we consider the arid conditions under which most of the Mesembs grow in habitat, we must realize that in cultivation, with its necessarily more frequent watering, a rich soil mix is not required. However, the Mesembs do not live on sand alone, and since this soilless mix contains no nutrients of its own to speak of, during the growing period we feed with a low-nitrogen, water-soluble fertilizer (10-30-20) about one-twentieth the recommended strength. We find it more

convenient to give them light feedings when watering than to add nutrients to the basic soil mix. Use a fertilizer low in nitrogen (the first number) because the soil in habitat is always lacking in this element. Keep in mind that fertilizers should be used cautiously in order to preserve the natural characteristics of the plants. With the Mesembs, 'bigger' is certainly not 'better'. The grossly overfed and overwatered plants seen in some collections bear little resemblance to their habitat relatives.

The availability of pH testing strips has given rise to a new aspect of the preparation of soil mixtures. Roughly defined, the pH value of a solution is the logarithm of the reciprocal of the hydrogen ion concentration given on a scale with values of 1 to 14 with 7 representing the neutral point. In layman's terms, this means a pH reading above 7 shows increasing alkalinity, while a reading below 7 indicates increasing acidity. We usually aim for a slightly acid soil with a pH of 5.8 to 6.8, as most plants seem to adapt to this range. Plants such as *Lithops julii* and *L. ruschiorum* appear to be growing very well in a mix with a pH of 5.5 to 6.5, while in habitat they are found in highly alkaline areas with a soil pH of 8.2 to 9.5. These plants have not only retained their habitat characteristics but have flowered profusely, attesting to their vast adaptive capabilities. Therefore, it appears we need not be overly concerned with pH since the average sandy mix seems to fall well within the tolerance range of the Mesembs. Further experimentation may show that some species prefer a more acid

or alkaline mix, but until this preference has been established, we are better off with our slightly acid mix, thus avoiding either extreme.

Mesembs are being grown successfully in a multitude of soils such as: 1 part peat to 3 parts fine gravel, half peat and half sand, pure sand with a bit of clayey loam, half peat and half vermiculite, 1 part peat to 2 parts fine sand, etc. Of course, fertilizer must be used with the soilless mixes containing no nutrients of their own. These mixes illustrate the varieties of soils the Mesembs will tolerate and should help dispel much of the beginner's apprehension over concocting an appropriate potting mix. The essential characteristic of any good soil mix is ample porosity which allows quick drainage. For the beginner, the easiest solution is three parts of a commercial potting mix and one or two parts of coarse sand. Aquarium and bird gravel are readily available in pet shops and supermarkets for those without access to natural sand. If you are fortunate enough to have a local source of river sand, screen it through a quarter-inch screen to remove any large pebbles present, then through an ordinary window screen to sift out the very fine particles, using that portion remaining on the screen. Another source for sand is a builders supply company that sells the sharp mortar sand used by bricklayers. Do not use ocean beach sand as it contains too much salt.

After you have become an expert Mesemb grower, you will more than likely want to experiment with variations on the basic mix and eventually settle on one that works best for you under your growing conditions. Many collectors add a dash of bonemeal or

spoonful of charcoal to their mix, but these gourmet touches may be supplied later when you have a better understanding of the needs of your plants. To those who are old hands at growing the Mesembs, there is only one bit of advice: keep right on doing whatever is working for you!

Even though many believe it to be unnecessary and report excellent results without it, soil sterilization is a worthwhile precaution. Soil treated with steam so that the temperature is held at 180°F.(83°C.) for at least 30 minutes is freed of all plant pathogenic bacteria, fungi, nematodes, water molds, and most plant viruses. Sterilization of small batches of soil may be handled easily in the kitchen oven. Place a pan of wet soil mix in the oven at about 200°F., insert a meat thermometer into the batch of soil, and when the temperature reaches 180°F., leave for at least 30 minutes. By timing the first operation, subsequent batches of equal proportions may be treated without bothering with the thermometer; just set the timer. Old electric fry pans or roasters make excellent soil sterilizers, with some of the roasters having a capacity of 6 gallons of mix. These can often be found at very reasonable prices in used appliance shops, thrift shops, or Salvation Army Stores. Make certain the mix is very wet, as wet heat is more effective than dry heat. The sterilized soil may be stored in covered containers until needed.

POTTING

There are devout advocates of both clay and plastic pots. We prefer plastic for several reasons: plastic is easier to clean and sterilize, plastic

pots are readily available in most sizes, plastic is lighter in weight, and plastic is about the only material available in a square shape which we definitely prefer for its space-saving characteristic. True, unglazed clay pots with their porosity will compensate for some misjudgment in watering, but no material can offset gross overwatering. During our Texas summers with greenhouse temperatures soaring to 120°F. (50°C.) with exhaust fans going full blast, we find that clay pots dry out far too quickly. Those in cooler or more humid climates may find clay pots more suitable. Many growers have reported superior results with styrofoam pots, and this is undoubtedly a useful material. One nursery in South Africa uses styrofoam shoe boxes extensively as growing flats, another grows the plants beautifully in asbestos-cement trays. The material from which your pots are made is of little significance as long as it has ample drainage and you learn how often to water with that particular type of pot. In order to assure adequate drainage, place a piece of broken pot or a small piece of aluminum screen over the hole in the bottom, add about a half-inch layer of small gravel or Perlite, and then the soil.

Aesthetic, as well as growing requirements, should be considered when choosing the pot for a certain plant. A pot that is too large or too small for the plant is not only visually disturbing but usually presents cultivation problems. The root system of the plant must be accommodated, those with long taproots such as *Lithops* requiring a deeper pot than the more shallow rooted *Conophytum*. Decorative pots can certainly enhance the over-all appearance of



L. julii [Reticulate fm.]

a plant collection if tastefully selected. Avoid the cheap, garish pots, often in the shape of some animal, that fight with the plants for attention. Nothing is more ridiculous than a plant growing out of the back of a ceramic dog or duck! There are excellent potters, craftsmen, throughout the country creating beautiful pots for your plants. Stoneware, with its subtle, earthy glazes, is especially suitable for the Mesembs. Bonsai pots also make excellent homes for your plants and come in a multitude of sizes.

The Mesembs are not terrarium plants, as the close atmosphere of a terrarium is definitely not to their liking. In habitat there is always air movement, even in the scorching summer, and often in winter the wind howls with gale force. Also, the partially enclosed planting in a terrarium must deal with a higher humidity than if planted in an open pot.

Few of the Mesembs have a very elaborate root system, so potting them up is relatively simple. Use soil only slightly damp so it will settle around the roots when the pot is tapped on the bench or table. Some growers recommend using dry soil when potting new arrivals, but it is almost impossible to moisten dry soil uniformly without saturating it. By using a slightly damp mix at the start, only a light watering is needed to settle the soil around the roots after potting, thus avoiding over watering. The Mesembs need only a slight amount of moisture present in the soil mix to promote rooting.

Plants with long taproots such as *Lithops*, are easily potted by making a funnel-shaped cavity in the soil with a pencil or a sharpened piece of dowl. The hole should be deep enough to accommodate the taproot. Hold the plant at the desired level and gently push soil up against the root with the pencil. Other plants may require a different technique, depending on their root system. After potting, water lightly and place in a semi-shaded spot for a few days. Newly transplanted plants should be brought into full sunlight gradually over a period of several days. During this period of reestablishment, the plants should not be over-watered but kept fairly dry.

Many collectors prefer to group their plants in community pots or dish gardens. This is practical only if common sense is used in selecting plants with similar needs to be planted together. Planting *Monilaria*, which only needs water for a short period in the fall, with *Faucaria* which needs frequent watering through the summer when *Monilaria* is completely dormant, would obviously not

succeed. Usually different species of the same genus will thrive in communal bliss, but even then you may hit a snag. Some species of *Lithops* may have absorbed their old leaves and the new ones are ready for a bit of water, while other species or varieties may still be drawing moisture from the old leaves which are fully turgid. Perhaps some of the other Mesembs in a community planting may show new leaves and are ready for growth while others are still coasting along in dormancy. The difficulty may be resolved, somewhat, by carefully spot-watering those plants that need it, leaving the others as dry as possible. Another solution is potting your plants in small pots, arranging them in your larger planter, then filling with pebbles and stones until the smaller pots are hidden. This gives the appearance of a group planting while allowing each plant to be given individual attention. Therefore, when selecting plants to be grown together in one container, try to choose those whose growing habits are as similar as possible. The growing and resting periods of the various plants will be given later as each genus is discussed.

WATERING

When in doubt, don't! This statement is not as flippanant as it may sound because even if a Mesemb is dry and in need of water, a few more days or weeks without added moisture will seldom be fatal. On the other hand, most cannot survive prolonged periods in soggy soil and may suddenly rot if over watered. They take advantage of every drop of moisture, storing it away in their succulent leaves for future use. If water

is available for a sufficient length of time, they will literally gorge themselves to the bursting point and the leaves will crack open. This happens occasionally when the weather remains cool and cloudy for a number of days after watering. The main point is that these plants will survive for long periods with little or no water and little harm is done if they get a bit dry and start to shrivel.

As an experiment one summer we selected 20 different species of Mesembs growing in 3 in. pots. These were placed in a flat and were not watered, not even a sprinkle, from March to November. Even though they had to face one of our hotter summers with no moisture, all survived. Admittedly, they were a shriveled, wrinkled, miserable bunch of plants, but they did survive and perked up after watering in November. This harsh treatment is certainly not recommended for your collection and is mentioned here merely to illustrate how little moisture is really necessary for these plants.

The extremely diverse conditions under which various collectors grow their plants preclude any attempt to formulate a regimen for watering. Plants grown under lights in a heated apartment will certainly require more frequent watering than those in a humid greenhouse. With experience, you will be able to take your cue from the appearance or feel of your plants. If the plants are turgid and firm to your touch and the surface is smooth, showing little or no wrinkling, they do not need water. On the other hand, if they show pronounced wrinkling and feel a bit soft, perhaps it is time for another watering. As an aid to the beginner, a more detailed guide to watering is included under

the heading of the different genera with special mention being made of the problem plants.

Any discussion of watering the Mesembs usually gets around to the controversy of bottom watering versus overhead watering. That is, whether they should be watered by placing the pot in a pan of water until the soil is saturated through capillary attraction, or by watering from above in the usual manner. When a porous, quick-draining soil mix is used, one method seems to be as satisfactory as the other. Early accounts dealing with the cultivation of the Mesembs tend to blame overhead watering for the sudden demise of a plant through rot, claiming dampness at the base of the leaves to be the cause. In a sense this is true in that the fungi and bacteria proven to be the cause of soft rot in Mesembs thrive in a moist and humid environment. However, it would be almost



L. hallii near Upington

impossible to water from the bottom without dampening the surface enough to promote spread of the pathogens and the subsequent rotting of the infected plants. Using sterilized soil in the beginning and occasionally watering with Chinosol will keep rot under control.

Bottom watering does have certain advantages. For those plants with a deep root system, watering from the bottom assures adequate moisture in the lower root area which they may not receive with a shallow watering from the top. Seedlings seem to benefit from bottom watering, as it tends to draw their roots downward, helping them develop a stronger root system. One possible disadvantage of this method of watering is the accumulation of soluble salts in the growing medium since there is no leaching. However, this doesn't appear to be a serious problem with the Mesembs, as they grow naturally in soils with high concentrations of mineral salts.

Watering from the top has the advantage of convenience, particularly when growing large quantities of plants, and we find it satisfactory for our operation. Light watering from the top during the prolonged dormant period of some species seems to be beneficial as it prevents complete desiccation of the root system without providing enough water to stimulate the plants into premature growth cycles.

Although watering is a problem with the Mesembs, as their needs differ from those of most other plants, it need not be too troublesome, provided we keep in mind the conditions under which they grow naturally. Their evolution has been in one direction — the development of

a highly efficient water-storage system which enables them to survive prolonged periods of drought.

LIGHT, TEMPERATURE, AND HUMIDITY

The Mesembs, as a whole, are true sun worshippers and need all the light they can get, especially in winter. In habitat the light is dazzling in summer, but even in winter the sun can be quite brilliant. However, we must keep in mind that many of these plants grow with only their tops exposed, often between rocks and pebbles which afford them some slight relief from the sun. This is especially true of the very succulent, mimicry plants such as *Lithops*, *Fenestraria*, *Ophthalmophyllum*, etc. We must also consider the effect of heat on the roots of plants confined in small pots in cultivation. Here in Texas, we find most species do well with a bit of shade during our sunny, hot summers when the light intensity is 10,000 foot candles. We use 20% shading starting in late spring and add another 20% for a couple of months in mid-summer. This amount of light seems ample as we have no problem flowering even the more difficult species.

Mesemb enthusiasts without access to a greenhouse may not be as handicapped as they might think, for beautiful collections of *Lithops* and other Mesembs can be found perfectly happy on a windowsill. The humidity usually found in greenhouses where extremely low outside temperatures prevent airing out in winter, can be detrimental to growing the Mesembs. Even though they might



**Lithops dinteri v. brevis site with
Pachypodium namaguanum, Richtersveld**

tolerate it for a few years, it certainly is not to their liking, and those plants sitting comfortably in their sunny window are much better off. In their natural habitat there is always some air movement, a breeze, or often a gale, but never a humid, stagnant atmosphere. Therefore, if your greenhouse tends to have a high humidity, use fans for air circulation, and open a few vents on sunny days when temperatures permit, in order to dry it out as much as possible. For those with a mixed collection of other plants that need frequent watering and its resulting humidity, a solution might be the partitioning off of a section just for Mesembs. If this is impractical, then at least take the humidity into consideration when watering and give the Mesembs even less than you would ordinarily.

As for temperature, we have found that the Mesembs do very well with a

minimum of 40° F. Even those winter growers that are being watered do not seem to suffer at this temperature. Of course, the temperature quickly rises to 80 or 100° F. in the greenhouses when the sunlight hits them. Some species often experience freezing temperatures in habitat, but there too, it is usually of short duration with the sun warming the soil quickly.

A vivid recollection comes to mind of standing on a low, Namaqualand hilltop in mid-winter, chilled to the bones while wearing three shirts and a jacket. The ground was literally covered with *Argyrodema*, *Dactylopsis*, and *Conophytum*, all fully turgid and obviously thriving under these conditions. The next morning at Springbok, after scraping ice from the windshield of our van, we found *Conophytum* on the hilltop overlooking the town, quite happy with its frigid location. This experience led us to lower our minimum temperatures in the houses for adult plants to 40° F., but since many collections are mixed, having some plants needing more warmth, a higher temperature of about 50° F. is suitable in most cases.

For those with neither greenhouse nor sunny window, there is growing under lights, a method rapidly gaining popularity. We have personally experimented only with seedlings to any great extent under lights and found they did very well. However, many collectors have written to us claiming similar results with adult plants. There are many fluorescent tubes available that supposedly reproduce the full spectrum of sunlight, and there is no reason why Mesembs could not thrive under these surrogate suns. Most light gardeners

seem to achieve best results by growing the plants fairly close to the light source, about 4 to 6 inches from the tubes. Others report satisfactory results with the plants as far as 14 inches from the tubes. A day length of 12 to 14 hours is sufficient. As mentioned previously, growing under lights with room conditions will require more frequent watering. Also, a small fan to provide some air circulation and dissipate the heat from the lights is most beneficial.

DISEASES and PESTS

Luckily, the Mesembs are not disease-prone, except for soft rot with the highly succulent stemless Mesembs, and about the only insect pests to guard against are the everlasting mealybug and red spider plus an occasional cricket, grasshopper, or caterpillar in some areas. Mice and squirrels *can* also wreck a few plants if they happen to get in the greenhouse. Rather than recommending specific insecticides, some of which may soon be prohibited due to the increasing concern over their impact on our ecology, you are referred to your local garden center or nursery for those currently approved. Your local county Agricultural Agent is also very helpful and able to furnish you with the latest information regarding pesticides.

Mealy bugs are small, white, soft-bodied insects about 3/16 of an inch long. Their waxy coating protects them from some insecticides, but if the infestation is not too severe, they are quickly dispatched by touching them with a small brush or bit of cotton dipped in alcohol. A close watch must be kept to eliminate any culprit

escaping this first treatment as well as those hatching later from eggs previously laid. The most likely place to find mealybugs on the Mesembs is between the old dried leaves and the new ones on the highly succulent species. Here, the "mealies" find the close, secret spot they love to start a colony.

Red spider, or spider mite, is barely visible, even to those with excellent eyesight, and is usually discovered by the appearance of tiny whitish or yellowish speckled areas on the leaves where it has fed. Contrary to the mealybug, which thrives in a warm, humid atmosphere, the red spider likes it dry. Only with heavy infestation is the minute webbing visible, and usually only the shrubby type of Mesembs is threatened by this pest. A simple treatment is to wash them off the plants with a forceful spray of water, holding the pot at an angle to prevent soaking the soil. Check with your local garden center for a spray for mites.

With crickets, caterpillars, grasshoppers, snails, etc., the damage is only too obvious - a bite taken out of a plant and invariably your most prized one! It is incredible how a cricket or grasshopper can unerringly locate a flat of *Lithops optica* cv. *Rubra* to snack on among thousands of less valuable plants.

Here again, the Mesemb collector is lucky; as a plant such as *Lithops*, *Dinteranthus*, *Conophytum*, *Argyroderna*, and others of similar growing habit will put out a new set of leaves the next growing period as the old ones dry up, leaving an unmarred specimen for future enjoyment. Even with the less succulent species, the damaged leaf will eventually dry up as growth proceeds. An

immediate seek-and-destroy mission is the best solution to these occasional predators.

Probably the most surprising calamity faced by the beginning collector is that of watching a seemingly healthy plant rot and turn to mush almost overnight. This catastrophe usually happens when plants are overwatered or under stress created by long periods of low light. An excellent study of the cause of soft rot in *Lithops* by J. A. Jump *et al.* (1980) at last gives us the answer to this riddle. The study tells us that the rot is caused by several species of fungi which probably enter the plant through open stomata below soil level. If noticed in time, the area of rot can be trimmed from the leaf, or in the case of a double-bodied plant the infected body can be removed at the root in order to save the remainder of the plant. Unfortunately, the rot is usually discovered after the plant collapses.

The best procedure, of course, is prevention by keeping the plants on the dry side and periodic treatment with Chinosol (8-hydroxyquinoline sulphate). It has been found that plants in infected soil resist the rot until they are put under stress by low light and/or excessive dampness. That is why you are urged to resist the temptation to overwater and overfertilize your plants; this is against their nature and while you may produce an abnormally large plant in a short time, you will also produce a weak one, ready to drop at the first hint of adversity. Such treatment also tends to destroy the very characteristic so admired by the true Mesemb lover, that of a hard, tough, compact plant.

SEED GERMINATION

Although the Mesembs are easily propagated by seeds, you can increase the odds of successful propagation by taking the precaution of sterilizing pots and soil mix, as well as any tools used during the process. Soil sterilization has already been discussed under SOIL. Pots and tools are sterilized by cleaning and then soaking them for 15 minutes in a mixture of 3 tablespoons of Chlorox to one quart of water. Drain and let dry before using them.

To sow seeds, take a pot of firmed-down basic soil mix and scatter a sprinkling of fine gravel, such as white bird gravel sold in pet shops, over the surface. Spread only a sparse covering so that the seeds will have little nooks and crannies in which to settle as they are sown. After the seeds have been scattered over the surface of the seed pot, a dusting of fine sand helps settle them into the crevices between the fine gravel but care should be taken not to cover the seeds completely. The seed pot should then be placed in a tray of Chinosol solution about half as deep as the pot and left to soak until the top of the soil mix is thoroughly wet. This Chinosol treatment (see DISEASES and PESTS) is one last precaution against damping off, the bane of propagation by seeds.

After the soil is saturated, remove the pots from the soaking tray and cover with plastic or a sheet of glass to provide the humidity necessary for germination. If only a few seed pots are involved you can easily put them into plastic 'baggies' and tie the tops.

A group of pots may be placed in a deeper tray or pan and plastic or a sheet of glass placed over the top of the tray. In the nursery we use 4 x 8 ft. tables covered with heavy plastic sheeting, the sides being raised and clipped to the sides of the seed pots to form a tray for bottom watering. A tent of plastic sheeting is then constructed over each seed table to provide humidity. It is of utmost importance to maintain the humidity until germination is completed; once the seed pot dries out, germination almost invariably ends.

Since the majority of the Mesemb are winter growers, we prefer to plant in the fall when the shorter days and cool nights provide the most favorable conditions for germination. A temperature of 70° F.(20° C.) is suitable with germination being retarded as temperatures rise above 80°. Cool night temperatures down to 50° F. (10° C.) seem to be beneficial as long as they rise again during the day. About 60% shading is used in the beginning with this being reduced as the seedlings progress. A sheet of tissue paper or piece of netting will supply the necessary shading for your seed pots.

Under these conditions the seeds of most species germinate between 3 and 7 days. *Dinteranthus vanzylii* is usually the last to germinate, sometimes taking as long as two weeks. Under lights, the germination period will be somewhat prolonged, usually about double the time required under natural conditions.

After germination is well under way, the covering should be slightly raised since even very young seedlings do not care for humid, stagnant air. During this period watering, if needed, should be done from the bottom as even the finest spray from

above might disturb the germinating seeds. Once the major wave of germination appears to be over, start lifting the covering from the pots gradually so that by the time the seedlings are a month or two old the covering has been completely removed. At this time they can be watered with a fine spray from the top or bottom-watering may be continued. Any signs of fungus or damping-off causing rot in the seed pots should be treated immediately with a fungicide or Chinosol and the treated pot should be allowed to dry out a bit.

If germination is not up to your expectations, do not be too eager to blame the seeds. On the whole, seeds of the *Mesembryanthemaceae* remain viable for 4 to 5 years, many germinating better when they are a year or two old. Occasionally several pots of the same batch of seeds germinate fully, while one with seemingly identical treatment may show very poor germination. Obviously the conditions in this pot, whether less light, less moisture, excessive heat, or whatever, differed from the others enough to inhibit germination.

You may wonder about these elaborate preparations for seed propagation when you run across volunteer seedlings casually germinating in a pot from seeds washed out of capsules during watering. Just consider how small the percentage of germination is compared to that under the optimum conditions provided by our seed-sowing routine; it is well worth the trouble.

For the first year the Mesemb seedlings require more water and shade than do the adult plants. However, do not keep the young seedlings constantly damp; allow the pots to dry out on the surface between

waterings after the seedlings are two to three months old. At the same time gradually remove some of the shading until they are getting only 30% to 40% shade in order to harden them off for transplanting and their subsequent growth into adulthood.

Transplanting may begin as soon as the seedlings can be handled, but is more easily accomplished when the plants are about a year old. They may be transplanted into large pans or individual pots, depending on the species and its growth habit. *Lithops*, *Argyroderma*, *Conophytum*, *Dinteranthus*, etc. do better as group plantings in larger pots or pans while the more robust, shrubby Mesembs such as *Rhombophyllum*, *Trichodiadema*, *Mestoklema*, *Faucaria*, and the like may be transplanted directly into individual pots. The species developing large, tuberous roots such as *Nananthus* and *Aloinopsis* need a deeper pot to encourage and accommodate such a root system. Keep in mind that the small, individual pots will require much more attention to their moisture needs than the larger more stable pans of group plantings.

The soil mix should be slightly damp for transplanting so that a hole made to receive the seedling will retain its shape. Make a funnel-shaped hole with a sharpened dowel (or pencil) deep enough to accept the roots of the seedling. Guide the seedling into the cavity being careful not to double back the root tips and holding it at the proper depth, firmly push the soil up to the roots with the dowel. When finished, the pots should be watered, preferably with a fungicide/bactericide as a protection against rot, and lightly shaded for a few days until the plants recover from the shock of transplanting.

CUTTINGS

Most of the Mesembs are easily propagated by cuttings, even the stemless genera such as *Lithops*. Clumps of these plants can be cut apart and each 'body' will root provided a bit of the meristem is taken with the cutting. *Conophytum* clumps are easily torn apart and rooted. Some of the mat-forming Mesembs like *Neohenricia* and some species of *Cephalophyllum*, *Gibbaeum* and *Chasmatophyllum* produce roots along their many runners which can be snipped off and potted up as separate plants. *Fenestraria* forms offset clusters which may be treated in the same manner.

Cuttings from the shrubby Mesembs are slightly more difficult but a good percentage of cuttings taken at the beginning of the growing season will strike roots. Let the cuttings cure for a day or two after treating the cut with a rooting hormone. Sand or pumice is often recommended as a rooting medium but the regular sandy Mesemb soil mix seems to work just as well. Watering the cuttings initially with a bactericide such as Chinosol is helpful. The close, humid atmosphere recommended for propagation of most cuttings is not desirable for the Mesembs, always the fresh air fiends, but the soil should be kept just slightly damp until roots are formed. One thing to remember when taking cuttings is that their flowers will not set seed if they are all from the same parent plant; you must have different plants for pollination. After rooting, the cuttings are treated as adult plants.

THE PLANTS

As a group, the Mesembs exhibit such a diversity of form, color, and markings that their popularity among collectors of succulent plants is quite understandable. Eons of evolution have equipped them with survival techniques which protect them during the extended periods of drought they are frequently forced to endure.

Some, the so-called stemless Mesembs, such as *Lithops*, *Argyroderma*, *Dinteranthus*, and *Ophthalmophyllum*, have solved the problem by reducing their exposed leaf surface to a minimum of two closely fused leaves, of which only the top surfaces are exposed to the sun. Others, including *Pleiospilos* and *Cerochlamys*, are covered with a waxy coating which helps to prevent transpiration. *Psammaphora* exudes a sticky substance which collects grains of sand to protect its young leaves from the blazing sun.

The Mesembs are programmed to grow whenever sufficient moisture is present, as this may be their one opportunity to store up the necessary water to sustain them through lengthy droughts. In habitat this growing period naturally corresponds with the period of rainfall and therein lies the source of a lot of confusion for growers in the northern hemisphere. Everyone knows that the seasons are reversed from one hemisphere to the other, i.e. winter falls during July and August in South Africa while summer comes in January and February. So when we read that *Gibbaeum* comes from the Little Karoo where it receives only winter rains, we cleverly put this knowledge to use and say, "Aha! Since the seasons are reversed, this means the

plant grows in summer in our northern hemisphere." Not so! It grows in the northern hemisphere, as it does in South Africa or anywhere else, when the day-length, temperature, and moisture are suitable for growth, not according to the calendar month. So *Gibbaeum* and other winter growers need to be watered during our winter. If watered during our hot summer months of July and August when the greenhouse temperature often soars to 115° F., it will more than likely rot.

So plants which prefer a winter growing period in habitat will more than likely prefer a winter growing period in cultivation although in the northern latitudes where some areas have week after week of sunless skies in winter, it may be advantageous to give some of the normally winter-growing Mesembs their dormant period in winter and growing period in summer. It appears that the successful switching of growing seasons depends on the nocturnal temperature. In areas where the temperatures at night are relatively cool, a switch is possible with some of the species but others, such as *Conophytum*, *Mitrophyllum*, *Monilaria*, and many of the *Cheiridopsis*, insist on going dormant when the days become long and hot. We find it impossible to switch these plants under our hot summer conditions here in Texas where the night temperatures can remain above 85° F. even with exhaust fans running. Consequently, we give them their normal winter growing period.

Some of the Mesembs announce the beginning of their growth period by showing the tips of the new leaves, or bursting through the dried remains of the old ones as in the



Monilaria moniliformis, dormant



Monilaria moniliformis, growing

a valuable reference to help you formulate a workable chart of your own.

In the following discussion of the different genera, the basic soil mix for Mesembs is suitable unless otherwise indicated. The specific months mentioned in relation to flowering, watering, etc. are for the northern hemisphere unless stated as being related to their African habitat.

Please become familiar with the botanical names of the plants and use them! Common names such as "Split Rock", "Tiger Jaws", or "Baby Toes" are certainly more familiar than the corresponding botanical you will be able to read their signs with greater understanding. Keep notes on your various plants: when their growing periods begin, when they go dormant, when they flower, when watered, etc. This will become

case of *Conophytum*, *Oophytum*, *Lithops*, and *Cheiridopsis*. Others, particularly *Monilaria*, will remain dormant until they receive the moisture necessary to trigger the growth mechanism. Many simply do as other plants: begin to show new leaf growth.

A definite schedule for growing or resting can be worked out only by the individual collector for his unique growing situation. Charts have been worked out showing the dormant and growth periods for the plants, when they should be watered, and when they flower, but these charts are only useful to those growing under conditions identical to those of the chart maker. The best 'chart' to follow is the one written by your plants. They will usually let you know when they are ready to grow and as you become more familiar with their cycle,

names, but "Split Rock" may mean a plant quite different from a *Pleiospilos bolusii* to another collector. The Latin and Greek botanical names are not only very descriptive, for the most part, but enable a collector from any country in the world to identify the plant being discussed. Pronunciation difficulties should not be allowed to curtail the use of botanical names because even botanists from different countries pronounce the names differently but still manage to communicate precisely the intended plant. Besides, most of the Mesembs are not common, hence no common names, so take a stab at it!

ACRODON

(From the Greek *acro* meaning tip, and *odonto* meaning tooth)

The three species are very similar with attractive "candy-stripe" flowers. The petals are white, edged in pink, with a pink stripe half way up the center of each petal in *A. subulatus*. Growing period is in fall and winter, flowering in January and February. Keep fairly dry after flowering and through the summer, watering lightly when the leaves show signs of shriveling. As the name implies, the long pointed leaves have tiny teeth at their tips.

ALOINOPSIS

(From *Aloe* and the Greek *ops* meaning appearance, referring to the similar habits of the two plants)

This one needs a fairly deep pot to accommodate the rather large tuberous root system. It seems to need a winter growing period, flowering in late winter and spring. *A. rubrolineata*, *A. orpenii*, and *A. schooneesii* have yellowish bronze flowers with a thin red stripe down the center of each



Acrodon subulatus



Aloinopsis schooneesii

petal; *A. luckhoffii*, *A. peersii*, and *A. setifera* are yellow flowering; and *A. spathulata* has pink flowers. Older plants may be raised so that the interesting root system shows above soil level to make a very attractive planting.

ANTEGIBBAEUM

(From the Latin *ante* meaning before, and *Gibbaeum*, referring to it being a forerunner of *Gibbaeum*.)

Closely related to *Gibbaeum*, it comes from the same area in the Little Karoo where it gets its scant moisture in winter. Cultivate as *Gibbaeum*.

ARGYRODERMA

(From the Greek *argyro* meaning silver, and *derma* meaning skin)

An extremely succulent genus with

silvery-green, smooth leaves, *Argyroderma* comes from the Knersvlakte area of Namaqualand. It is definitely a winter grower but needs only enough water to keep it from shriveling as heavy watering will cause it to split open. This frequently occurs when watering is followed by several days of cloudy, rainy weather so lighter, more frequent watering is recommended over heavy soakings. Some of the species begin flowering in October, continuing on through December with their white, yellow, or purple flowers. In summer, *Argyroderma* should be kept very dry, light watering given only when the plants shrivel badly. Grow in full sun to bring out the silver coloring.

ASTRIDIA

(Named after Mrs. Astrid Schwantes)

Habitat is a small area in the Richtersveld and South West Africa/Namibia around the mouth of the Orange River. Grows and flowers in winter. Give a dry rest in summer.

BERGERANTHUS

(Named for botanist Alwin Berger)

Found mostly in the South Eastern Cape area between Port Elizabeth and East London, *Bergeranthus* can get rain in all seasons but in cultivation seems to do best with a growing period during the cooler months. Exception is *B. glenensis* coming from the Orange Free State; this one grows well in summer. Yellow flowers.

BERRISFORDIA

(Named for the discoverer, G. Berrisford)

Attractive, low-growing, monotypic species from the Khamies Mountains



Argyroderma delaetii

in Namaqualand, *B. khamiesbergensis* is a winter grower with pink flowers.

BIJLIA

(Named in honor of Mrs. D. van der Bijl)

Another monotypic genus, *Bijlia cana*, with its smooth, sculptural leaves, is a most desirable plant. Found only in the area around Prince Albert, it is at its best when given a winter growing period and plenty of sun. After the numerous yellow flowers appear in winter, decrease watering to prepare it for a rather dry summer rest.

BRAUNSIDA

(Named in honor of Dr. H. Brauns)

A winter grower, flowering white or pink in late winter or early spring. Water lightly during the summer rest period.

CARRUANTHUS

(From *carry* meaning Karoo and the Greek *anthus* meaning flower)

Although the two species of *Carruanthus* are found just inside a summer rainfall area near Willowmore, they seem to do best in cultivation with a fall growing period; the yellow flowers appearing in late winter.

CEPHALOPHYLLUM

(From the Greek *cephalo* meaning head, and *phyllum* meaning leaf)

Over 60 species of this low-growing, mat-forming shrubby Mesemb are found from the southwestern Cape area all the way up the coast past Luderitz, South West Africa/Namibia. The rainfall in these various areas may come in any season but



Bijlia cana



Cephalophyllum alstonii

Cephalophyllum thrives best in cultivation with a winter growing period. Flowers are profuse and vary in color from yellow to bronze to pink to the deep red of *C. alstonii*.

CEROCHLAMYS

(From the Greek *kero* meaning wax, and *chlamys* meaning cloak)

The name refers to the waxy coating of the leaves. The one species, *C. pachyphylla* is found in the Little Karoo. Given a winter growing period, its pink flowers appear in mid-winter; the variety *albiflora* flowering white, of course.

CHASMATOPHYLLUM

(From the Greek *chasmato* meaning gaping, and *phyllum* meaning leaf)

Forms low shrubby clumps quickly. Although found mainly in summer rainfall areas, in cultivation it does well with a winter growing period, preferring only light watering during the long hot days of summer. An exception is *C. musculinum* which seems to like a summer growing period to match its habitat rainfall in the Orange Free State. Flowers yellow.

CHEIRIDOPSIS

(From the Greek *cheiris* meaning sleeve, and *ops* meaning appearance)

A large genus containing over 90 species found from Cape Town to Luderitz. The name pertains to the habit some species have of protecting the the new growth with the drying remains of the older leaves; a protective sleeve. From winter rainfall areas, *Cheiridopsis* is definitely a winter grower for us here in Texas. Watering should begin in the fall as



Cheiridopsis candidissima



Cheiridopsis peculiaris

the new leaves show signs of emerging. Flowers are yellow, orange, white, or purple and flowering usually begins with the intense purple of *C. purpurea* in November with other species flowering on into March or April. After flowering, reduce watering to prepare the plants for a dry rest in summer when the old leaves are drying into protective sleeves. Those species not forming the dry sheaths need slightly more watering in summer when their leaves show signs of pronounced shriveling. *Cheiridopsis* is an easily grown genus with many attractive species.

CONOPHYTUM

(From the Greek *cono* meaning cone, and *phytum* meaning plant)

Containing nearly 300 species, this genus is badly in need of the current revisions being made which, hopefully, will eliminate many obvious duplications. *Conophytum* is a winter grower with its growing period usually announced by the flower pushing through the old leaves. Flowers are all colors: white, yellow, greenish, orange, pink, and purple. In summer the old, dry leaves provide protection for the new growth. Water carefully through its winter growing period to prevent the leaves from splitting open from excess moisture. Since most species have a relatively shallow root system, *Conophytum* seems to prefer more frequent light watering to periodic heavy soakings.

Although some of the species such as *C. calculus* grow in full sun in habitat, many find a foothold in nooks and crannies near the tops of mountains where they get some shading. A most spectacular sight is



Conophytum obcordellum v. *mundum*



Conophytum stephanii, habitat

the habitat of the hairy *C. stephanii* which grows in clumps as large as fists in almost vertical fissures of quartzite near the top of a mountain range. In cultivation the 'Conos' are happier with some light shading, especially in summer when dormant. At this time give only light sprayings which dampen the soil enough to prevent the roots from drying out completely but not enough to promote growth.

CYLINDROPHYLLUM

(From the Greek *cylindro* meaning cylinder, and *phyllum* meaning leaf)

Easily-grown compact shrubby Mesemb with cylindrical leaves. Give it a fall to winter growing period with moderate watering. Forms dense shrubs with age with white to yellow flowers.

DACTYLOPSIS

(From the Greek *dactyl* meaning finger or toe, and *ops* meaning like or appearance)

During its winter growing period in the Knersvlakte area of Namaqualand, *Dactyloopsis digitata* resembles clumps of fat, green sausages! There it grows by the thousands in saline soil with some clay. Success in cultivation depends on giving it a complete dry rest in summer with only an occasional light spraying during the cooler periods of the day from time to time. The thick finger-like leaves dry up at this time, protecting the new leaves forming inside. Small white flowers appear near the tips of the leaves in late winter. A saline solution of one teaspoon of common table salt per quart of water may be used every other watering to help harden the plant for its summer rest.

One observation is that it invariably becomes smaller in cultivation. Collected plants, even those in South African collections, tend to produce smaller leaves each growing period.

DELOSPERMA

(from the Greek *delo* meaning visible, and *sperma* meaning seed)

A widespread shrubby Mesemb, *Delosperma* is found from Luderitz down the coast to Cape Town, all across the southern part of South Africa, up through the Transvaal into Zimbabwe, and on up to Saudi Arabia! It is grown primarily for its abundant red, white, or yellow flowers. Seems to grow and flower most of the year with its main growing period in summer. Keep slightly drier in winter.



Dactyloopsis digitata

DIDYMAOTUS

(From the Greek *didyma* meaning double or twin and *otus* meaning ear)

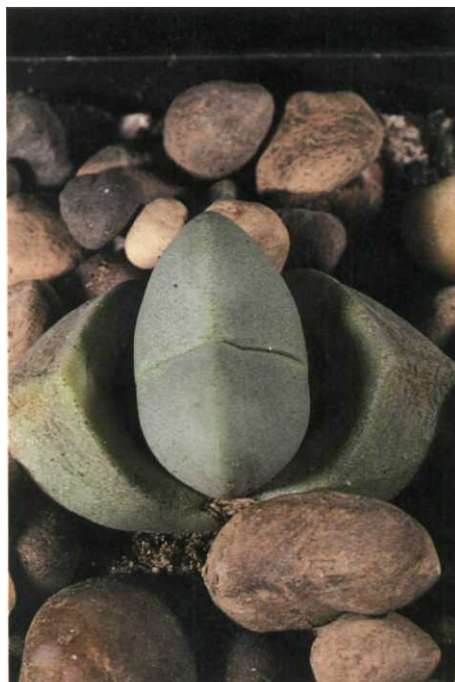
Another monotypic genus, *Didymaotus lapidiformis*, is found in the Ceres Karoo with its scant winter rainfall. Success in cultivation depends on keeping it very dry, even during its winter growing period, and giving it full sunlight. The name refers to the two thick, ear-like bracts which form on each side of the plant and from which white to pink flowers emerge at flowering time.

DINTERANTHUS

(Named in honor of Prof. Kurt Dinter)

Choice mimicry plants from an area on both sides of the Orange River west of Uppington to around Pofadder and Warmbad. This area gets mostly summer rain showers, and in cultivation *Dinteranthus* is best grown by watering in late summer, through the flowering period, tapering off after flowering as the new bodies absorb moisture from the old. Through winter they should be kept quite dry with a watering period being given again in spring when the old leaves are almost consumed. In summer *Dinteranthus* needs to bake in the sun to bring out its beautiful pink-grey coloring, with just enough moisture to prevent pronounced shriveling.

The first to flower for us is *D. microspermus*, usually in August, but some years as early as July. Next is *D. microspermus* ssp. *puberulus* in September followed by *D. wilmotianus* in October and *D. wilmotianus* ssp. *impunctatus* in November along with *D. pole-evansii*. The remaining species, *D. vanzylii*, (not 'vanzijlii' as



Didymaotus lapidiformis



Dinteranthus wilmotianus

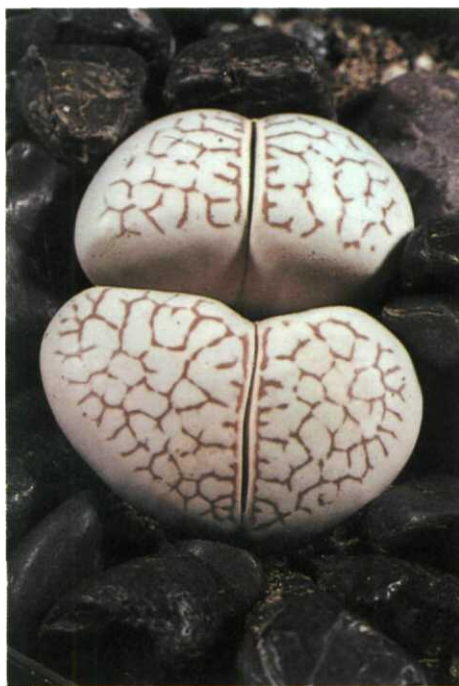
incorrectly spelled in earlier literature) flowers in late November and was first classified as *Lithops* which it closely resembles. *Dinteranthus* is a yellow-flowering genus with the exception of *D. pole-evansii* which produces a bi-colored flower, the outer petals being white while the inner ones are yellow. These are all very popular plants and pose no real problem unless overwatered.

Although German and English experts keep telling us that *D. wilmotianus* neither branches nor forms clumps, it does in fact form rather large clumps readily as do the other species. Evidently these experts are the followers of that unknown philosopher who said, "All Indians walk single file, at least the one I saw did"!

DIPLOSOMA

(From the Greek *diplo* meaning double or two and *soma* meaning body)

The name refers to the two opposing sets of prostrate leaves. The two species: *D. leipoldtii* and *D. retroversum* are found in a very small area not far off the main highway, N-11, in Cape Province near Piquetberg. During a mid-winter visit, many large fully turgid specimens of *D. retroversum* were found. In summer the leaves dry up completely making it impossible to find in habitat. The plants should be kept very dry in cultivation during their summer dormant period. In the fall the appearance of the tiny leaf tips is the signal to resume watering. The soil in habitat is a saline, clayey mixture so watering with slightly salty water as with *Dactyloopsis* is beneficial in preparing it for its summer rest. Flowers purple in winter.



Dinteranthus vanzylii

DRACOPHILUS

(From the Greek *draco* meaning dragon and *philo* meaning friendly or loving)

Habitat is the area between Alexander Bay at the mouth of the Orange River up the coast to Luderitz, most of it being in the prohibited diamond area. *Dracophilus* seems to prefer a fairly dry rest in summer but flowers profusely whenever watered, especially *D. delaetianus*. The lavender flowers are very fragrant and quite attractive against the dense clumps of grey-green leaves.

DROSANTHEMUM

(From the Greek *dros* meaning dew and *anthem* meaning flower)

Grown mainly for its flowers which include every color except blue, the

95 species of *Drosanthemum* are found along the southern and western coast of Cape Province up into Namaland in S.W. Africa/Namibia. This shrubby Mesemb can be planted outside in summer and usually flowers the first year from seed.

EBERLANZIA

(Named in honor of F. Eberlanz of Luderitz)

Another shrubby Mesemb found in southern Cape Province, along the Orange River and southern S.W. Africa/Namibia to Luderitz. White to purple flowers in clusters, may be grown out in summer.

EBRACTEOLA

From the Latin *bracteol* meaning bract and *e* meaning without)

Forms attractive dwarf clumps with thick root, white or pink flowers in winter. Grows in small area west of Luderitz and just south of Windhoek in S.W. Africa/Namibia.

FAUCARIA

(From the Latin *fauc* meaning throat or jaw and the Greek *ari* meaning much)

As the name implies, clumps of *Faucaria* with the soft teeth usually found on the leaf edges resemble many gaping jaws. An easily grown genus of 33 species found in the southeastern Cape Province and a small pocket in the southern area of the Great Karoo. Here it gets mostly summer rains, so in cultivation it is given a summer growing period. *Faucaria* quickly forms dense clumps and is most attractive in winter when the leaves take on a purplish hue if the plants are kept dry and given plenty of sun. It can withstand exces-



Ebracteola candida



Faucaria tuberculosa

sive watering better than most of the highly succulent Mesembs and is recommended for the beginning collector. The yellow or white flowers appear in late summer through mid-winter.

FENESTRARIA

(From the Latin *fenestra* meaning window and the Greek *ari* meaning much)

The name refers to the transparent window in the tip of each club-like leaf. The two species, *F. aurantiaca* and *F. rhopalophylla* inhabit a small area along the coast beginning a few miles north of Luderitz and ending just south of the Orange River around Alexander Bay. Here they grow almost completely buried in the sand, depending on coastal fogs for their moisture. In cultivation, *Fenestraria* is best grown well out of the soil due to our higher humidity. Some collectors grow it successfully by planting it rather low in a pot and filling almost to the leaf tips with coarse gravel, but most prefer to grow it well out of the soil so that it may be seen and admired. Add about a third more sand to the basic mix for this plant.

Fenestraria is a winter grower, though its water requirements are moderate, and should be left to coast through the summer with only an occasional light sprinkling. Overwatering causes the leaf tips to literally burst from the excess water they try to store, leaving a scar as if someone had circumscribed the leaf with a knife. Both species flower from October into January with the new leaves forming at the same time.

Early accounts list *F. aurantiaca* as yellow-flowering but both white and yellow-flowering plants of this spe-



Fenestraria aurantiaca

cies have been found in habitat. The white-flowering *F. rhopalophylla* is a smaller plant than *F. aurantiaca* with shorter leaves, more sharply defined windows, and smaller flowers.

FRITHIA

(Named in honor of Mr. Frank Frith)

Frithia resembles *Fenestraria* at first glance, but the leaves are rough and the tips are truncate, rather than smooth and rounded as with *Fenestraria*. Coming from a small area near Pretoria in the Transvaal where it receives only summer rain, *Frithia* grows and flowers throughout the summer. The attractive flowers with the outer halves of the petals a bright magenta appear as early as March, depending on available moisture. In fact, it can be kept flowering



Frithia pulchra

all year if there is sufficient light and warmth in winter to permit watering. However, we prefer to give it a dry rest in winter and begin our regular watering in March. *Frithia* is a very desirable plant, easily grown, compact, and most rewarding.

GIBBAEUM

(From the Latin *gibb* meaning humped)

The 21 species of this very interesting Mesemb are found, for the most part, in a small area in the Little Karoo where the infrequent moisture they receive comes as soaking winter rains. The two opposing leaves are of different lengths, often markedly so, with the shorter leaf appearing as a 'hump'; hence the name. *Gibbaeum* is definitely a winter

grower and should be watered in fall as the leaves show signs of new growth. Watering should be continued through the flowering period which usually begins with the magenta flowers of *G. dispar* in January or February and ends in April or May with *G. haagei* or *G. schwantesii*.

In summer *Gibbaeum* should be left to bake in the sun with only occasional light sprinkling to prevent the roots from drying out completely. *G. petrense* and *G. heathii* may require slightly more moisture than most of the other species, but overwatering during the hot summer days is likely to cause rot. Most of the species form clumps readily, and some, such as *G. pretense*, produce large mats of dense growth.



Gibbaeum heathii



Gibbaeum pubescens

GLOTTIPHYLLUM

(From the Greek *glotti* meaning tongue, and *phyllum* meaning leaf)

The name refers to the habit of the linguiform leaves stretching out from the stem like tongues. This is an easily-grown Mesemb from south-eastern Cape Province, and it thrives on neglect, requiring only moderate watering during its growing period.

Glottiphyllum can receive rain at all seasons in habitat, but in cultivation we find it best to give it a fall to winter growing season when it brightens the greenhouse with masses of large yellow flowers. Give it full sun and little water to bring out its coloration and prevent gross obesity. Those with cooler summer temperatures may find that this plant grows equally well in summer which will present fewer problems with over-watering.

HEREROA

(Named after the *Hereros*, S.W. African natives)

An attractive small, compact shrubby Mesemb found in scattered locations through Eastern Cape Province, Little Karoo, Great Karoo, Cape Province, Bushmanland, and on up into S.W. Africa/Namibia north of Luderitz. Because of this wide-spread distribution, they receive habitat moisture in all seasons, but in cultivation *Hereroa* does well with a fall-winter growing period with yellow flowers appearing in late winter. Again, cooler summer temperatures may allow you to grow this plant in summer.

HERREANTHUS

(Named after Hans Herre and the Greek *anthos* meaning flower)



Herreanthus meyeri

A monotypic genus, the single species, *H. meyeri*, is found near Steinkopf, Cape Province, where it gets winter rain. Given a fall-winter growing period in cultivation, the scented white flowers appear in the fall.

IMITARIA

(From the Latin *imitari* meaning to imitate)

The name refers to the plant's similarity to *Conophytum*, *Ophthalmophyllum*, *Lithops*, and *Gibbaeum*. The single species of this monotypic genus, *Imitaria muirii*, was classified at one time as *Gibbaeum nebrownii*. Coming from the very dry winter rainfall area of the Little Karoo, we give this one a winter growing period, treating it much like *Gibbaeum*. It flowers for us in winter with the larger clumps very attractive when covered with the magenta flowers. Like *Gibbaeum*, this plant needs to rest during the heat of the summer.

JACOBSENIA

(Named in honor of Dr. Herman Jacobsen)

Coming from a small area in Namaqualand near Vanrhynsdorp, this plant prefers a winter growing period with only a little water in summer. The rather large white flowers of *J. kolbei* appear in late winter as do the light yellow flowers of the other species: *J. hallii*.

JENSENOBOTRYA

(Named after E. Jensen and the Greek *botrya* meaning cluster of grapes)

As the name implies, this plant, with its bunches of rounded leaves,



Imitaria muirii

resembles a cluster of grapes. The single species, *J. lossowiana*, is found only on Dolphin Hill at Spencers Bay in the restricted diamond area of the Namib, where it subsists on the constant sea fogs. This environmental factor is responsible for making *Jensenobotrya* unique among the Mesembryaceae as the stems of some of the plants may be as old as 200 years! This is possible only because of the sea fogs which keep it alive during prolonged droughts when plants in less fortunate localities may die back to their roots. Taking this habitat information into consideration, the logical treatment in cultivation seems to be light frequent sprayings during its winter growing period.

JUTTADINTERIA

(Named in honor of Mrs. Jutta Dinter)

This genus grows in the southern tip of the Namib from Luderitz, across the Orange River into the Richtersveld where it gets winter rains. Watering should begin in late fall as the new growth is seen, tapering off after flowering. It appears to be sensitive to overwatering in summer when it should be kept on the dry side. Grown in full sun, *Juttadinteria* develops its attractive grey-green color.

LAMPRANTHUS

(From the Greek *lampro* meaning brilliant or clear and *anthos* meaning flower)

A very widespread genus, this shrubby Mesemb is found from the southern tip of South West Africa/Namibia, through southeastern Cape Province, around the Cape almost to Durban. It is grown mainly for its colorful flowers and may be planted out in summer where it forms large clumps.

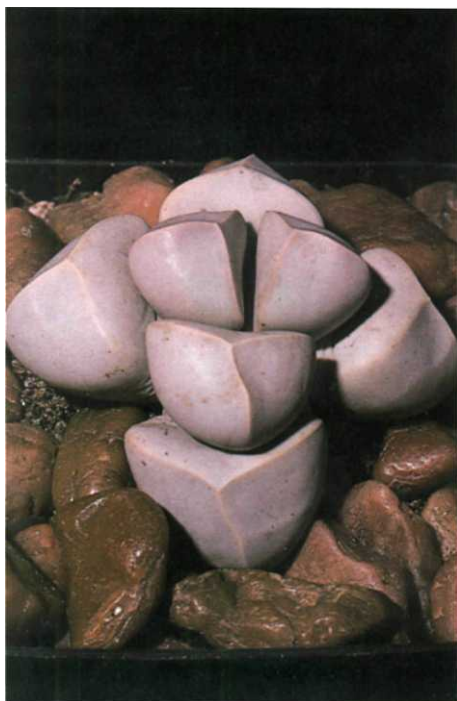
LAPIDARIA

(From the Latin *lapis* meaning a stone, *lapidaria*, a group of stones)

A monotypic genus, *Lapidaria margaretæ* comes from an area near Warmbad, S.W. Africa/Namibia as does *Dinteranthus microspermus* and it should be given about the same treatment. Here we have an example of how common names can be misleading: sometimes called the "Karoo Rose", *Lapidaria* is not known to exist in the Karoo! It was formerly classified as belonging to the genus *Dinteranthus*, then as an *Argyrod-*

erma, until it was finally decided that this beautiful plant is truly in a class by itself.

Give it a late summer growing period as the flower buds develop. If given ample water at flowering time *Lapidaria* will often produce a second flower within a month after the first, the second bud pushing out past the still-green seedpod of the first flower. The petals of the rather large yellow flowers tend to stain the leaves when they wilt, but the stain is easily wiped off with a damp sponge. Of course, great care should be taken not to over-water this plant as its habitat in southern Namaland is one of the most arid areas in South West Africa/Namibia. It should be given plenty of sun to develop the attractive grey-green coloring, tinged with pink, of its sharply chisled leaves.



Lapidaria margaretæ

LITHOPS

(From the Greek *litho* meaning stone and *ops* meaning face, or appearance)

The fascination this genus holds for the true "Lithoparian" is understandable when one considers the infinite variety of color and markings found in *Lithops*! According to latest revisions of the genus by Desmond T. Cole, there are over 145 varieties, forms, and cultivars representing 36 species. Some *Lithops* once given forma status are now considered cultivars. This not only eliminates some of the repetitious forma epithets used in the past, but provides a means of coping with new aberrants appearing in cultivation.

The habitat of *Lithops* is quite extensive in area but only sparsely populated with widely separated colonies. From the northern Transvaal near the border of Zimbabwe, colonies of *Lithops* exist westward through the northern and central areas of Cape Province, southward into the Little Karoo, and northward up the west coast through South West Africa/Namibia, almost to Angola.

Some species are found in the grassveld where they receive ample water and nourishment. Others exist along the edges of depressions called "pans" which may keep the plants flooded for days when they are filled by heavy rains. However, most *Lithops* are found in very arid, desolate areas where they struggle for survival against the broiling sun and sandblasting wind. Here they eke out a meager but tenacious existence, hounded not only by the elements, but by foraging animals such as goats, birds, baboons, and graz-

ing buck. In some colonies rodents have completely eradicated the plants by digging around them and eating the roots. The average annual rainfall in many of these areas is 50 mm or 2 inches! In many locations the plants seldom get actual rain but subsist on the heavy fogs that form during the night.

They are the masters of camouflage, some having coloration matching the soil, others resembling the stones among which they grow, and still others may have streaks or splotches of soil color along with the translucence of the stained white quartz of their habitat. During periods of drought, which is most of the time, *Lithops* are almost impossible to find in habitat as they shrivel up and become almost buried in the sand. Much has been written about their so-called "contractile" roots with which they pull themselves down into the soil, but there is a question concerning whether this ostrich-like behavior is due to root action or to the extreme shriveling and subsequent covering by blowing sand.

Lithops may be found on low, quartz-covered mounds called "kopjies" encompassing only a few square yards as well as on the steep sides of a mountain in the Halenbergs overlooking a gravel quarry. At Luderitz you will find *L. optica* growing only a stone's throw from the sea while the type locality of *L. gesinae* v. *annae* sends you on a half-day's climb up a mountain near Helmeringhausen.

Taking all of this into consideration, it is amazing that all species of *Lithops* can adapt to the growing conditions of our greenhouses and homes. Although coming from both winter and summer rainfall areas, *Lithops* in

cultivation seem to conform agreeably to the schedule we have worked out. Beginning with flowering, which starts in late summer with the 'pseudotruncatellas', the plants should be watered whenever the soil dries out. After flowering, water is withheld so that the plants will absorb the moisture from the old leaves. We cease watering *Lithops* toward the end of November, giving them nothing until March when most of the old leaves are dry and paper thin. The exception is *L. optica* which flowers much later, usually in January, and needs light watering until that time. Remember, as long as there is enough moisture to keep the fibrous feeder roots going, the old leaves will remain plump while the new pair of leaves develop. Carried to the extreme, this can produce a grotesque plant sporting several pairs of leaves at the same time. Continuous growth also seems to prevent flower development.

When the old leaves have dried up, for the most part, in spring, there comes another period of watering to promote growth in the new leaves and plump them up for the hot summer. Let them coast through summer with only occasional light watering when shriveling becomes pronounced. Remember, *Lithops*, as do many of the other Mesembs, grow whenever there is sufficient moisture so their cycle must be controlled by manipulating their water supply.

Some collectors seem to think the plant is dormant when the old leaves or "bodies" begin shriveling in winter when water is withheld after flowering. However, inside those old leaves the new ones are developing which surely constitutes a state of active growth. After the new leaves have

reached their full size by early summer, there is actually no further development until the flower appears in the fall and the cycle begins again.

The sandy quick-draining soil of the basic Mesemb mix suits *Lithops* in cultivation, although some species grow in clayey soils in habitat. They detest stagnant humid air and should be given a dry airy atmosphere with plenty of light. Since few artificial environments can even approach the low humidity these plants are accustomed to in habitat, they should be potted up so that at least half of the body is above soil level as some protection against the soft rot (see DISEASES). Some collectors give the soil a top dressing of gravel or pebbles after planting to give the plants a more natural setting.



Lithops bromfieldii site,
Upington, Cape





L. comptonii v. *weberi*



L. dinteri



L. dinteri cv. *Dintergreen*



L. dinteri v. *brevis*



L. dinteri v. *frederici*



L. dinteri v. *multipunctata*



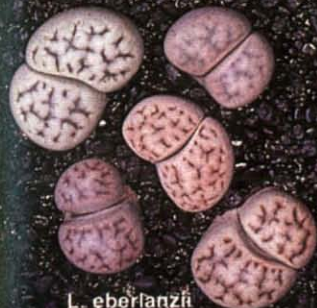
L. divergens



L. divergens v. *amethystina*



L. dorotheae



L. eberlanzii



L. eberlanzii [Erniana]



L. eberlanzii [Witputzensis]





L. hallii



L. hallii [Brown form]



L. hallii [Salicola reticulata]



L. hallii v. *ochracea*



L. hallii v. *ochracea*
cv. Green Soapstone



L. helmutii



L. herrei



L. herrei [Translucens]



L. herrei v. *geyeri*



L. herrei v. *geyeri* [Hillii]



L. julii



L. julii [Chrysocephala]



L. julii [Fuscous form]



L. julii [Littlewoodii]



L. julii [Reticulate form]



L. karasmontana



L. karasmontana [Alaisensis]



L. karasmontana
[Jacobseniana]



L. karasmontana
[Mickbergensis]



L. karasmontana [Opalina]



L. karasmontana
[Signalberg form]



L. karasmontana
[Summitatum]

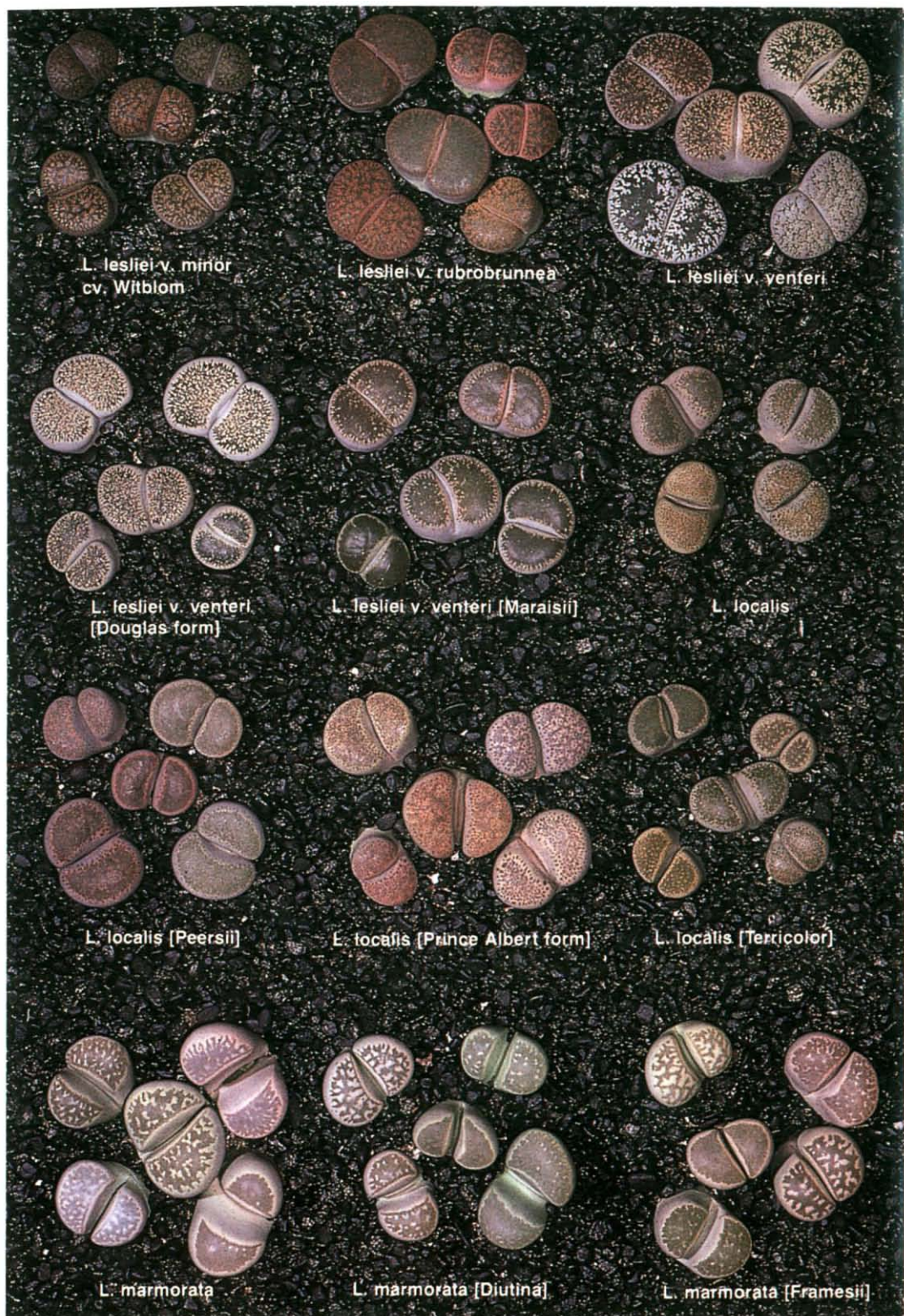


L. karasmontana v. *lericheana*



L. karasmontana v. *tischeri*







L. marmorata v. *elisae*



L. meyeri



L. naureeniae



L. olivacea



L. olivacea [Rose-brown form]



L. optica



L. optica [Maculate form]



L. optica cv. *Rubra*



L. otzeniana



L. otzeniana cv. *Aquamarine*



L. pseudotruncatella



L. pseudotruncatella [Alpina]



L. pseudotruncatella
[Mundtii]

L. pseudotruncatella
[Pallid form]

L. pseudotruncatella
v. *archerae*

L. pseudotruncatella
v. *dendritica*

L. pseudotruncatella v. *dendritica*
[Farinosa]

L. pseudotruncatella v. *dendritica*
[Pulmonuncula]

L. pseudotruncatella
v. *elisabethlae*

L. pseudotruncatella
v. *riehmerae*

L. pseudotruncatella v. *volkii*

L. ruschiorum

L. ruschiorum [Nellii]

L. ruschiorum
v. *lineata*



L. salicola



L. salicola (Maculate form)



L. schwantesii



L. schwantesii (Grey form)



L. schwantesii (Gulielmi)



L. schwantesii (Kuibisensis)



L. schwantesii (Trieblneri)



L. schwantesii v. *christinae*



L. schwantesii v. *christinae*
(Nutopdriftensis)



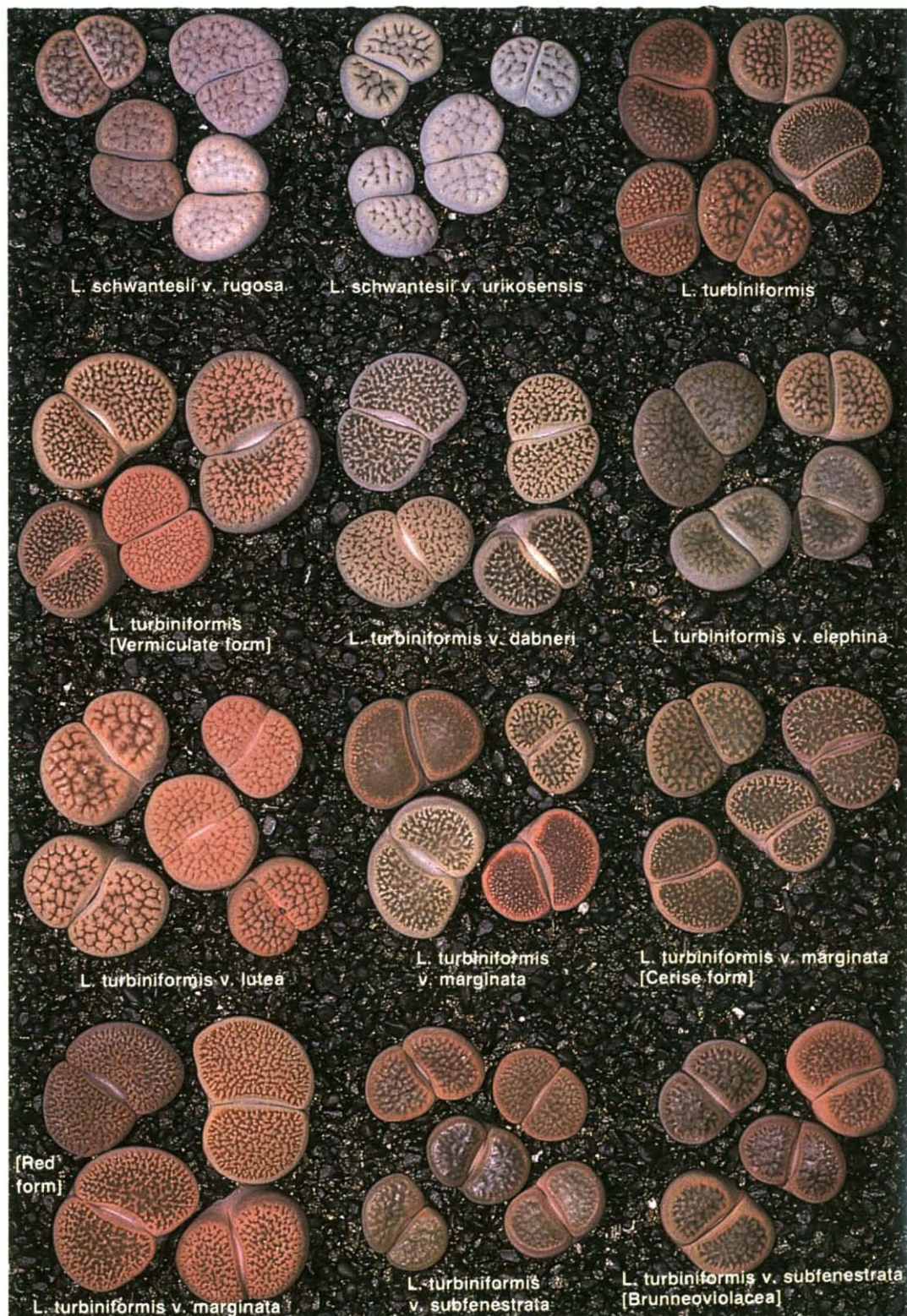
L. schwantesii v. *gebseri*



L. schwantesii v. *kunjasensis*



L. schwantesii v. *marthae*





L. turbiniformis v. *susannae*



L. vallis-mariae



L. vallis-mariae
[Margarethae]



L. vallis-mariae
v. *groendaaicensis*



L. verruculosa



L. verruculosa [Inae]



L. verruculosa v. *glabra*



L. villetii



L. villetii v. *deboeri*



L. villetii v. *kennedyi*



L. viridis



L. wernerii

MACHAIROPHYLLUM

(From the Greek *machair* meaning sword or dagger, and *phyllum* meaning leaf)

Coming primarily from the southern Cape area, *Machairophyllum* can receive rain in any season in nature and will grow whenever watered in cultivation. However, the typical Mesemb growing period of fall-winter seems to suit it best.

MAUGHANIELLA

(Named for Dr. H. Maughan Brown)

Another monotypic genus, *Maughaniella luckhoffii* is endemic to a small area in the Knersvlakte north of Vanrhynsdorp. This very rare Mesemb is similar in its growth habits to *Diplosoma* with the leaves drying up completely for the summer dormant period. In habitat it is found in a saline soil with such a high clay content that when dry, it feels like talc. However, there is the ever-present sand and quartz gravel to give the soil porosity. Plants collected in mid-winter in South Africa flowered and immediately became dormant when faced with our long hot summer days. The white to slightly pink flowers should appear in midwinter. Success in cultivation depends on letting it go completely dormant in summer when it will dry up to just a small button.

MESTOKLEMA

(From the Greek *mesto* meaning full and *klema* meaning small branch)

The name describes its growth habit of clustering of leaves on many small branches. The large, tuberous root system makes *Mestoklema* an attractive plant when raised so that

the roots are partly above the soil level. The branches can be pruned to keep it a compact miniature shrub. A summer growing period suits it well at which time it flowers profusely.

MEYEROPHYTUM

(Named in honor of Rev. G. Meyer)

The habitat of *Meyerophytum* is the Knersvlakte in Namaqualand and to the north around Anenous Pass. Here it receives winter fogs and drizzle. In cultivation it should be watered in the fall as the new leaves break through the dried skins of the old ones, much as with *Mitrophyllum*. The intense magenta flowers of *M. meyeri* are a very pleasant sight in mid-winter. This plant needs the typical dry rest in summer with only occasional light watering.



Meyerophytum meyeri

MIMETOPHYTUM

(From the Greek *mime* meaning an imitation and *phyton* meaning plant)

The name refers to its close resemblance to *Mitrophyllum* from which it differs only in the seed capsule. *Mimetophytum* is found in a small area of the Richtersveld near the Orange River northeast of Alexander Bay in the winter rainfall area. In cultivation it should be given the same treatment as *Mitrophyllum*.

MITROPHYLLUM

(From the Greek *mitr* meaning cap or turban and *phyllum* meaning leaf)

The two leaves joined almost to their tips resemble a Bishop's mitre, hence the name. Coming from the Richtersveld just south of the habitat of *Mimetophytum*, *Mitrophyllum*, grows in winter. Begin watering in fall as the new leaves show signs of bursting through the dried remains of the old leaves and continue until the white to yellow flowers appear in late winter. At this time watering should be reduced, giving only enough to keep the plants more or less turgid. In summer it should remain fairly dry, never receiving enough moisture to promote new growth. The old leaves protect the new growth developing inside through the hot arid summer and become paper-thin as fall approaches and the cycle begins again.

MONILARIA

(From the Latin *monil* meaning necklace or string of beads: *monilaria* meaning many strings)

The name refers to the closely joined nodes formed with each growing period which resemble a string of beads. From its Namaqualand habi-

tat we know *Monilaria* grows in winter and its cultivation is much the same as for *Mitrophyllum*. However, *Monilaria* sometimes has to be coaxed into its growing period by watering before there are any signs of new leaves. If there is no indication of new growth by October (early fall), it should be encouraged by watering. As the new leaves appear, more water may be given. Continue moderate watering until after flowering in late winter, but the leaves need not be fully turgid at all times; let them droop a bit between waterings. During the summer the leaves die back to the nodes and only light infrequent watering should be given during this dormant period. The plants appear to be dead at this time but the new growth inside is just waiting for the right conditions to send it into another growth cycle.



Mitrophyllum affinis

MUIRIA

(Named in honor of Dr. John Muir)

The habitat of *Muiria hortenseae* is the very arid Little Karoo, home of *Gibbaeum*. Here, the pitiful amount of moisture it gets usually comes in winter. In cultivation its habits are much the same as *Gibbaeum*, but *Muiria* should be allowed a very dry rest in summer when the old leaves dry and shrivel to protect the new growth inside.

NAMIBIA

(Named after the Namib Desert)

Coming from the prohibited Diamond Area around Luderitz, *Namibia* has been quite rare in collections until recently. The greyish mounds of very succulent leaves form extensive colonies on rocky outcroppings. In cultivation it is treated like *Juttadintheria* with a rather dry summer rest after its winter growing period.

NANANTHUS

(From the Greek *nanos* meaning dwarf and *anthos* meaning flower)

Growing in the eastern section of the Great Karoo, southern Kalahari, Orange Free State, and Transvaal, *Nananthus* gets mostly summer rains and does well with a late summer growing period in cultivation. The large tuberous roots make it an attractive plant when raised above soil level as the plant grows older. Numerous yellow flowers, some with red center stripes down each petal, cover the plant in its late summer-fall flowering period. It seems to appreciate ample watering during its growing period but allow it to dry out between waterings. Its long roots require a rather deep pot.



Nananthus transvaalensis

NELIA

(Named in honor of Prof. G.C. Nel)

Habitat is in northern Namaqualand, east and south of Port Nolloth with winter rains and fogs. In cultivation *Nelia* requires water from late fall through its late winter flowering period. In spring gradually reduce watering in preparation for a fairly dry summer rest. Once open, the small white flowers remain open day and night for several weeks.

NEOHENRICIA

(Named in honor of Dr. M. Henrici)

The single species, *Neohenricia sibbettii* comes from the center of the Great Karoo Near Victoria West where it receives scant summer rain. However, we have found that in cultivation it needs more water than one would think and consequently it gets water twice as often as most other

Mesembs. In winter keep it on the dry side but even then it requires more moisture than the average Mesemb. A dense, mat-forming dwarf, *Neohenricia* soon fills its pot and small whiteish flowers open late afternoon into night. Grow in strong light to produce the attractive reddish-brown coloration to the warty leaves.

ODONTOPHORUS

(From the Greek *odonto* meaning tooth and *phorus* meaning bearer)

The name describes the tooth-like projections found at the leaf tips. The small habitat area of *Odontophorus* lies just north of Steinkopf in the Richtersveld with its winter rains. In cultivation give it a growing period in fall and early winter. After flowering in mid winter, taper off on watering for its dry rest in summer.



Neohenricia sibbettii

OOPHYTUM

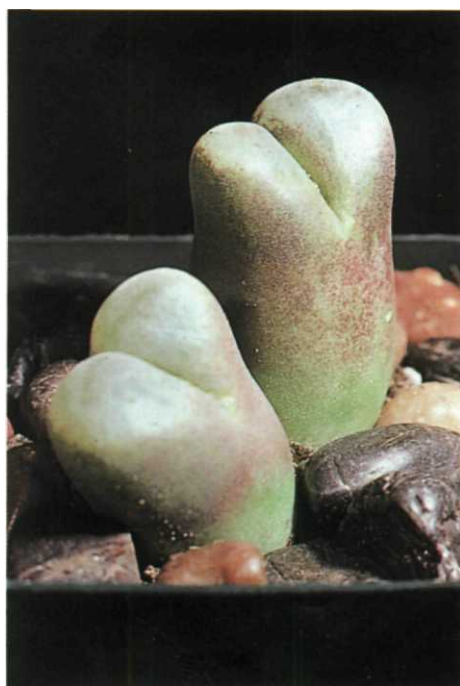
(From the Greek *oo* meaning egg and *phytum* meaning a plant)

A nice clump of this plant does indeed look like a cluster of tiny eggs. A winter grower from the Knersvlakte, *Oophytum* needs a dry summer rest like *Conophytum*.

OPHTHALMOPHYLLUM

(From the Greek *ophthalmo* meaning eye and *phyllum* meaning leaf)

Found east of the Richtersveld, down into Namaqualand and back across the Orange River in South West Africa/Namibia. Growing almost completely buried in habitat, the shiny tips of *Ophthalmophyllum* do resemble eyes as they catch a glint of sunlight. In cultivation it is best grown as *Lithops* with most of the plant above soil level to prevent rot.



Ophthalmophyllum dinteri

Give it a short growing period in fall, slacking off on watering by mid-winter and let it coast through a rather long summer dormant period with little watering. The white, pink, or magenta flowers herald the beginning of the growing period in fall.

OSCULARIA

(From the Latin *oscul* meaning little mouth: *oscularia*, a group of little mouths)

The opposing leaves, sometimes with tooth-like projections along the edges, give the appearance of many tiny mouths. Coming from the South Western Cape area just east of Cape Town, *Oscularia* receives an abundance of winter rain but little, if any, in summer. In cultivation it grows best when given a fall-winter growing season with the attractive pink flowers covering the small shrubs in late winter. Full sun gives it its nice grey coloration.

PLEIOSPILOS

(From the Greek *pleio* meaning full and *spilo* meaning spot)

As the name implies, the leaves of this genus are full of darker spots or dots. It is found in scattered colonies through the Karoo, South Eastern Cape, up into the Orange Free State. In some areas the rains may come at any time of the year, but it grows predominantly in summer rainfall areas. Popularly called "Split Rocks", *P. bolusii* and *P. nelii* are to be found in most collections of succulent plants. In cultivation give it a summer growing period and a fairly dry rest in winter after flowering. Over-watering may cause it to split.



Oscularia caulescens



Pleiospilos nelii

PSAMMOPHORA

(From the Greek *psammo* meaning sand and *phora* meaning to carry or bear)

This description refers to the plant being covered with grains of sand which are caught by a sticky substance exuded by the new leaves, providing some protection from the burning sun. The habitat of *Psammophora* is the southern part of the Namib from Luderitz, over the Orange River into the Richtersveld. It is a winter grower and water should be given in the fall as new leaves appear in the center of the cluster. After flowering in December, watering should be decreased, leading up to the dry rest in summer.

RABIEA

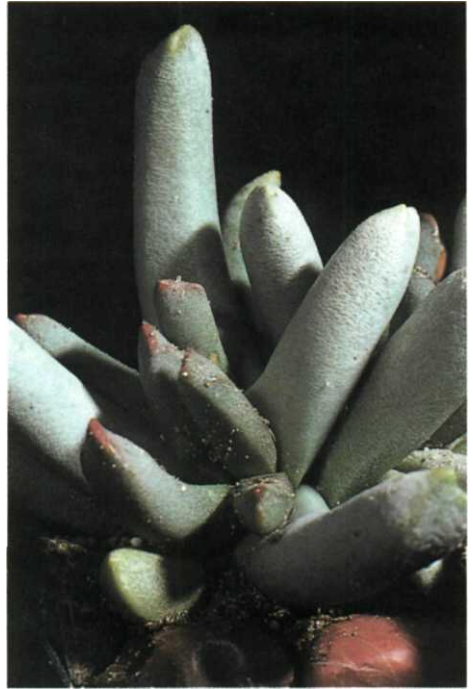
(Named after Rev. W.A. Rabie)

Coming from eastern Cape Province, the Karoo and Orange Free State, *Rabiea* gets mostly summer rain and does well with a summer growing period in cultivation. After the yellow flowers appear in late fall, give a fairly dry rest through winter.

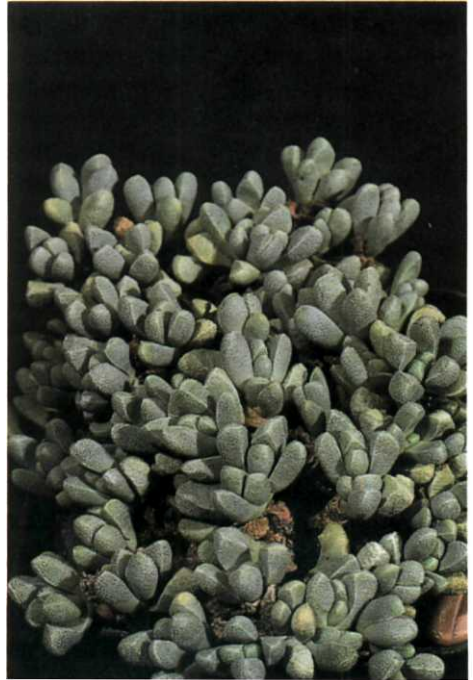
RHINEPHYLLUM

(From the Greek *rhine* meaning file or rasp and *phyllum* meaning leaf)

The name refers to the roughness of the leaves. Its habitat in the Great Karoo and the Little Karoo gives it a varied rainfall period, but in cultivation it does very well with the usual fall growing period for Mesembs. *R. muirii* is an exceptionally attractive plant with its fleshy root system. After flowering in early spring, watering should be decreased for the fairly dry summer rest. Grow in full sun for best coloration.



Psammophora longifolia



Rhinephylum muirii

RHOMBOPHYLLUM

(From the Greek *rhombo* meaning a parallelopiped and *phyllum* meaning leaf)

Habitat is the Great Karoo and South Eastern Cape within the summer rainfall area. Watering in early spring usually brings many yellow flowers from April through June. Continue moderate watering through the summer, giving it a fairly dry rest in winter. *Rhombophyllum* is an easy plant in cultivation and flowers profusely.

RUSCHIA

(Named in honor of Ernst Rusch)

This large (about 350 species) genus is widespread from Windhoek, S.W. Africa/Namibia, down to Cape Town and up into the Transvaal near Pretoria. This encompasses practically all climatic conditions and most species seem to adjust to either summer or winter watering schedules. We find the typical Mesemb fall-winter growing season suits *Ruschia* very well and in any event, it is easily grown in cultivation. The dwarf, compact species are especially nice in a collection.

RUSCHIANTHUS

(Named in honor of Ernst Rusch)

The single species, *Ruschianthus falcatus*, is found in a small area in southwestern Namaland in S.W. Africa/Namibia where the rains, if any, usually come in winter. Its scimitar-shaped leaves form attractive clumps, and the greenish-white flowers appear in late winter to spring. After flowering, water should be gradually decreased for a rather dry summer rest.



Rhombophyllum dolabriforme



Ruschia pygmaea



Ruschianthus falcatus

SCHWANTESIA

(Named in honor of Dr. G. Schwantes)

The habitat of *Schwantesia* is an area beginning at Luderitz, southeast to the Orange River, and crossing over into the Richtersveld and Bushmanland. Given its growing period in the fall and winter, *Schwantesia* flowers profusely through the winter, even into summer if watering is continued. In fact, this plant seems willing to grow whenever there is enough moisture. However, the best procedure in cultivation calls for a fairly dry summer rest, letting it bake in the sun to bring out the grey coloring tinged with pink along the leaf edge.



Schwantesia ruedebuschii

SPHALMANTHUS

(From the Greek *sphaler* meaning slippery or treacherous and *anthus* meaning flower)

The name refers to the condition created by the plant's runners rooting and forming loops which can trip a hiker. Coming primarily from the winter rain area along the coast from Luderitz to Cape Town, *Sphalmanthus* grows best in cultivation with a fall-winter growing period. The yellowish-green or reddish flowers appear in late winter. Give it a rest in summer.

STOMATIUM

(From the Greek *stomato* meaning mouth)

A widely scattered genus found in isolated colonies from the Richtersveld, down through Namaqualand, the Karoo, South Eastern Cape, and into the Orange Free State. Its name makes reference to the small, toothed leaf pairs giving the appearance of many gaping mouths. In cultivation it thrives on a fall and winter growing period with moderate watering. The yellow, white, or pink flowers open late afternoon or evening and are quite fragrant in most species. The short-stemmed branches form dense mats.

TITANOPSIS

(From the Greek *titano* meaning chalk and *opsis* meaning appearance)

The name refers to the chalky appearance given to the leaves by the tiny white tubercles. Although most information about *Titanopsis* mentions its need for additional lime or old brick mortar in the soil mix to



Sphalmanthus viridiflorus



Titanopsis calcarea

give an alkaline growing medium, we have found that it grows perfectly well in the slightly acidic mix used for the other Mesembs. For us it grows best with a winter growing period, flowering in mid-winter, and basking in the sun during its summer rest with little watering. Begin watering in the fall as new growth appears and continue with moderate watering through the flowering stage. After flowering, give it the usual drying-out period to prepare it for a summer rest.

TRICHODIADEMA

(From the Greek *tricho* meaning hair and *diadema* meaning crown)

The name refers to the tuft of bristles at the end of each leaf looking like a tiara or crown. Another widespread genus, *Trichodiadema* is found mainly in Namaqualand and across the southern Cape with a few isolated colonies in the Richtersveld and across the Orange River in southern S.W. Africa/Namibia. Not a difficult plant, a fall-winter growing

period suits it with only moderate watering in summer. Many species have a large, tuberous root system which may be raised partially above the soil level as the plants grow older to give a "Bonsai" effect.

VANHEERDEA

(Named in honor of P. van Heerde)

Although its habitat in Bushmanland gives it both winter and summer rainfall, in cultivation *Vanheerdea* seems to prefer a winter growing period with the flowers appearing in early spring. Its moisture requirements are negligible in any season, so keep it rather dry.

VANZIJLIA

(Named after Mrs. Dorothy van Zijl)

A shrubby Mesemb found in only two spots along the coast in the Vandrinsdorp area. Give it a fall-winter growing period and fairly dry rest in summer.



Trichodiadema stellatum

IN SUMMATION, let us repeat that the growing and resting schedules of the different genera given should be used only as a guide, changes being made as individual growing situations require them.

The Mesembs are far more adaptable than most collectors realize, many readily adjusting their growing or resting periods according to the amount of moisture present. The important factor is a definite cycle of growth and rest most suitable to your climate. Some species will remain in a constant state of growth as long as they are watered, but not only will plants forced into this prolonged growth lose their characteristic form, they seldom flower and soon die.

The most meaningful guide to growing the Mesembs is the one you will write yourself, if you keep an accurate record of the treatment you give your plants and their response to it. To the perceptive grower, even the occasional loss of a plant can contribute information which will lead to successful cultivation.

SUGGESTED READING

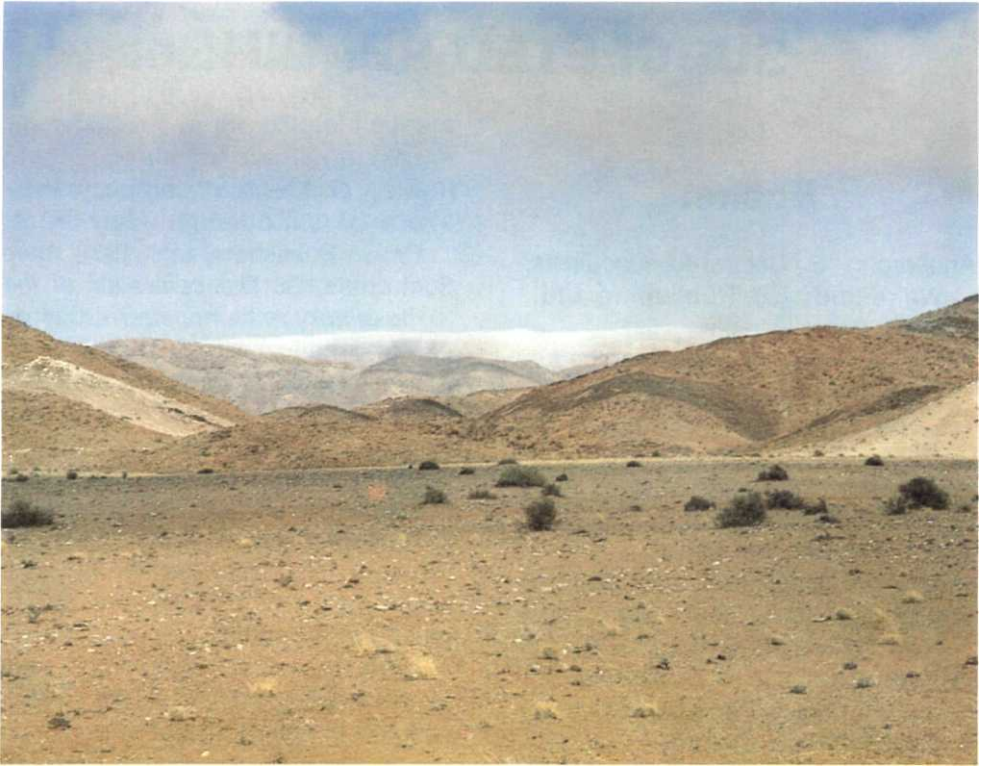
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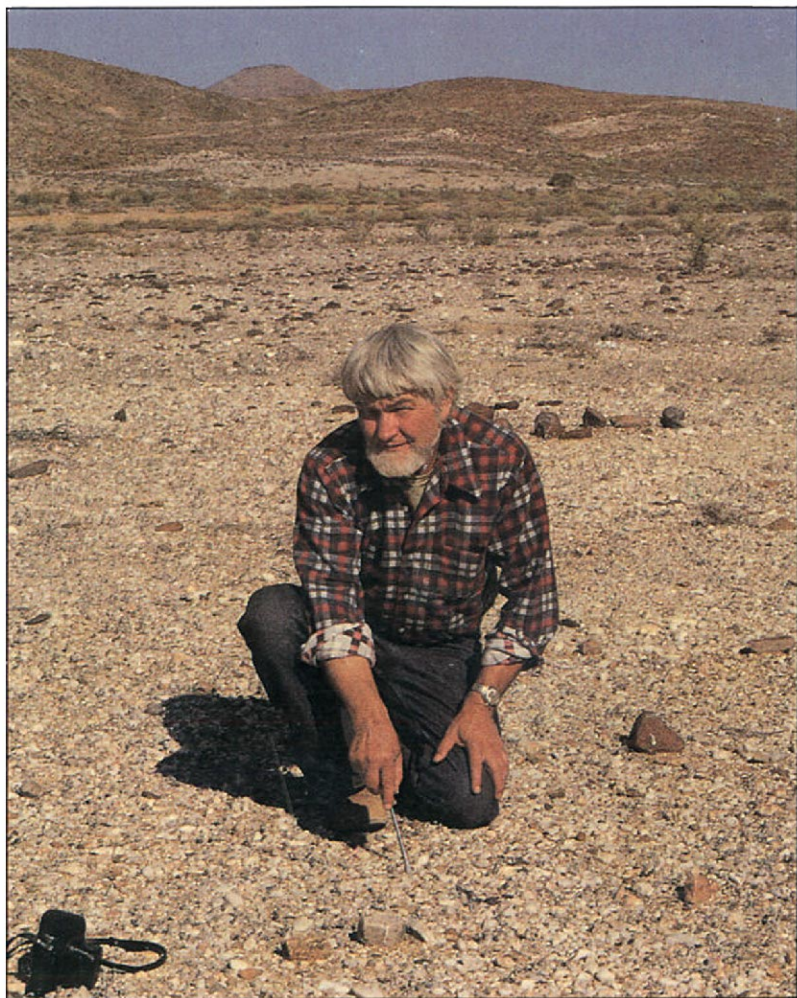
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Richtersveld, between Rosyntjie & Hellskloof



View from *L. schwantesii* site in Tiras Mts., S.W. Africa



**Author at *Lithops herrei* v. *geyeri* site,
Eksteenfontein, S. Africa**